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(54) Dental implant and related milling cutter for implant seating

(57) A dental implant of embedded or semi-embedded screw type. The implant (10) comprises a smooth cylindrical neck (12) for a dental prosthesis, and a threaded shank (11) having a conical core (13); the conical core (13) directly extends from the cylindrical neck (12) of the implant and is provided with a single-start cylindrical thread (16) having a diameter corresponding to that of the neck (12). The thread (16) is starting from the neck (12) and extends forwards over a longitudinally extending cut portion (17), terminating in the close vicinity of the front end of the threaded shank (11).

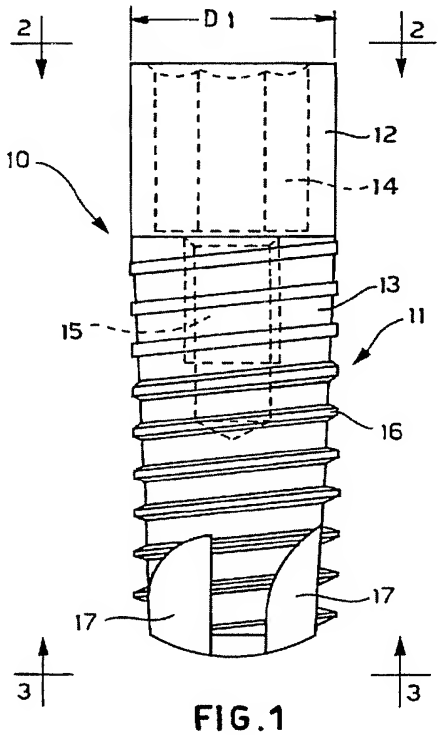

FIG.1

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Therefore, according to a first aspect of the invention, an implant has been provided of embedded or submerged screw type comprising a neck portion provided with fastening means for a dental prosthesis, and a threaded shank axially extending from said neck, said threaded shank having a conical core tapering from the neck portion towards a front end and provided with a single-start thread, characterized in that the neck portion of the implant is provided with a cylindrical smooth outer surface having a diameter, and in that the conical core is provided with a cylindrical thread directly extending from the neck portion of the implant, said cylindrical thread having an outer diameter corresponding to the outer diameter of the neck portion of the implant and extending with the same outer diameter up to the front end of the threaded shank.

According to another aspect of the invention, a drilling and milling tool has been provided for the seat of the dental implant referred to above, said tool comprising an elongated body provided with a rear-wardly extending stem for attachment to an operating device, said body comprising a rear cylindrical portion having a diameter corresponding to the outer diameter of the neck portion of the dental implant, as well as comprising a front milling portion having a drilling end tip, said front milling portion of the tool being provided with linear cutting edges, said cutting edges of the front milling portion longitudinally extending for a length and being provided with an outer conical shape corresponding to the length and to the conical shape of the threaded shank portion of the dental implant.

BRIEF DESCRIPTION OF THE DRAWINGS

These and further features of the dental implant and the drilling and milling tool according to the invention will be described hereinbelow with reference to the accompanying drawings, in which:

- Fig. 1 is a view of the implant showing the general features;
- Fig. 2 is a view from the rear end, along the line 2-2 of Figure 1;
- Fig. 3 is a view from the front end, along the line 3-3 of Figure 1;
- Fig. 4 is a longitudinal sectional view of the implant of Figure 1;
- Fig. 5 is a side view, on a different scale, of a first drilling and milling tool designed for an implant according to a first embodiment of the invention;
- Fig. 6 is a side view of the tool in a plane at 90° from that of Figure 5;
- Fig. 7 is a view from the front end of the tool according to figure 5;
- Fig. 8 is a view from the rear end of the tool according to Figure 5;
- Fig. 9 is a side view, on a different scale, of a second embodiment of a tool according to the invention;
- Fig. 10 is a side view of the tool in a plane at 90° from that of Figure 9;
- Fig. 11 is a view from the front end of the tool according to Figure 9;
- Fig. 12 is a sectional view along the line 12-12 of Fig. 9.

With reference now to Figures 1 to 4, we shall describe the screw implant according to the invention.

The screw implant, wholly indicated by reference 10, substantially consists of an elongated metal body, for example made of titanium, comprising a threaded shank 11 provided at its rear end with a smooth cylindrical neck portion 12 suitable for the insertion of a stump for the fastening of a dental prosthesis.

The cylindrical neck portion 12 extends directly into a conical core 13 tapering towards the front end, starting with the same diameter D1 of neck 12 so as to avoid the formation of intermediate connecting surfaces or steps between the neck 12 and the conical core 13 of the dental implant.

This makes it possible to achieve a high mechanical strength, in particular at the transition point between the neck 12 and the rear end of the conical core 13; however, in order to improve the stability of the implant, once it has been inserted into the receiving cavity of a bone, tapering the core 13 has a small conicity for example of between 2.5° and 5°, depending on the length of the core itself; in general, larger conicity are used for short implants or smaller conicity for longer implants so as to prevent excessive weakening of the implant at the bottom of an hexagonal hole 14 of the neck portion 12 necessary for insertion of a tool for screwing of the implant itself and as a seat for the fastening stump of a dental prosthesis.

In Figs. 1 and 4, reference number 15 denotes a threaded internal hole axially extending into the shank 11 from the hexagonal hole 17 of the neck, by means of which it is possible to removably fasten the stump for the dental prosthesis, after the same implant 10 has been definitively inserted and screwed into its implant cavity.

The shank 11 of the implant, as clearly shown in Figures 1 and 4, is provided with a cylindrical thread 16 having a trapezoidal profile, the external diameter of which corresponds exactly to the outer diameter of the smooth neck portion 12 of the implant.

neck portion (12) of the implant, said cylindrical thread (16) having an outer diameter corresponding to the outer diameter (D1) of the neck portion (12) of the implant (10) and extending with the same outer diameter up to the front end of the threaded shank (11).

2. Dental implant according to Claim 1, characterized in that the conical core (13) of the shank (11) has a conicity comprised between 2.5° and 5°.

3. Dental implant according to the preceding claims, characterized in that the thread (16) of the conical shank (11) has a trapezoidal cross-sectional shape.

4. Dental implant according to any one of the preceding claims, characterized in that the threaded shank (11) of the implant (10) has at least one longitudinal cavity (17) at its front end.

5. Dental implant according to Claim 4, characterized in that the cavity (17) extends over a few pitches of the thread (16) of the shank (11).

6. Tool suitable for the preparation of a conical seat for receiving a dental implant (10) according to the preceding claims, characterized by comprising an elongated body (18; 25) provided with a rear-wardly extending stem (22) for attachment to an operating device, said body (18; 25) comprising a rear cylindrical portion (19; 26) having a diameter corresponding to the outer diameter (D1) of the neck portion (12) of the dental implant (10), as well as comprising a front milling portion (20; 27) having a drilling end tip (21, 28), said front milling portion (20; 27) of the tool being provided with linear cutting edges (20"; 27', 27"), said cutting edges (20"; 27', 27") of the front milling portion longitudinally extending for a length and being provided with an outer conical profile corresponding to the length and the conical profile of the threaded shank portion (11) of the dental implant (10).

7. Tool according to Claim 6, characterized in that the front drilling part (21, 28) and the rear milling part (20) have linear cutting edges (20"; 27', 27") longitudinally arranged in a plane parallel to the longitudinal axis of the same tool.

8. Tool according to the preceding claims, characterized in that the cutting edges (27', 27") are provided in planes orthogonally arranged each other and parallelly extending to the longitudinal axis of the tool.

9. Tool according to the preceding claim, characterized in that the tip (21, 28) of the drilling portion comprises cutting edges longitudinally extending from the cutting edges (20"; 27', 27") of the same conical drilling portion (20, 27) of the tool.

10. Drilling, boring and/or milling tool according to the preceding claims, characterized by comprising a hole (23, 29) for circulation of a sterile cooling fluid, longitudinally extending from the rear portion and opening in the vicinity of the front drilling part (21, 28) of the tool.

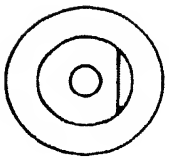

FIG. 8

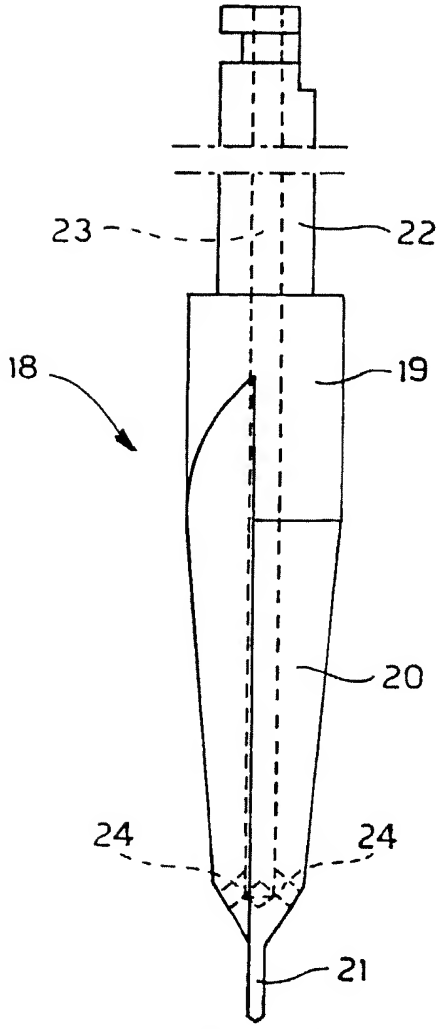

FIG. 5

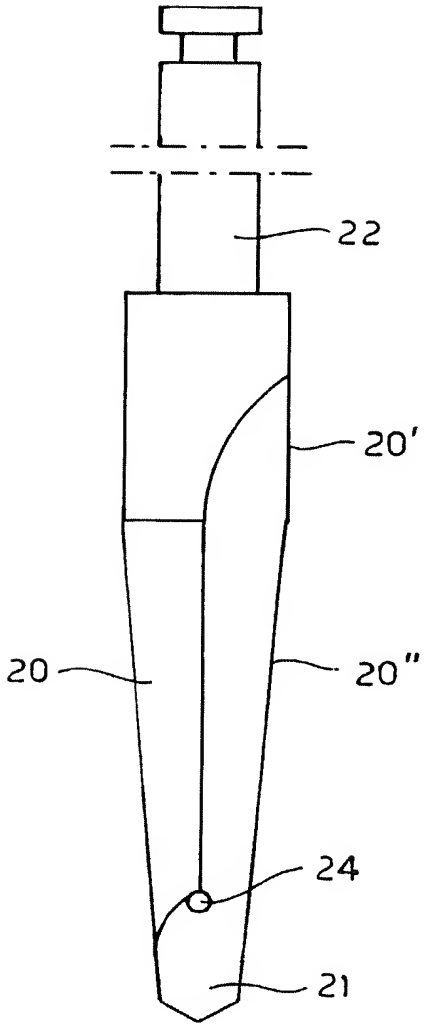

FIG. 6

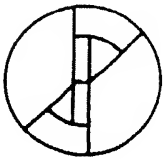

FIG. 7

): <EP 0819410A1 I >

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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 2123

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 282 789 A (GRAFELMANN) * the whole document *	1-5	A61C8/00
X Y	EP 0 424 734 A (VRESPA) * the whole document *	1-3 6-10	
Y	GB 1 419 273 A (REYNAUD) * the whole document *	6-10	
X	US 5 000 686 A (LAZZARA) * column 3, line 1 - line 30; figure 1 *	1-3	
A	EP 0 530 160 A (NOBELPHARMA) * the whole document *	4,5	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A61C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 October 1997	Vanrunxt, J

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